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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,734	01/09/2002	Chin-Kai Liu	67,200-536	7393

7590 01/21/2004
TUNG & ASSOCIATES
838 W. Long Lake Road, Suite 120
Bloomfield Hills, MI 48302

EXAMINER

NGUYEN, KHIEM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 01/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/043,734

Applicant(s)

LIU ET AL.

Examiner

Khiem D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's arguments filed 12/08/2003 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-2, 4-6, 8-16 and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (U.S. Patent 6,172,399).

In re claim 1, Lee discloses a method of forming a SIMS monitor device for determining a 2-dimensional doping profile of a semiconductor device structure comprising the steps of (See FIGS. 1a-11b and related text): providing a plurality of regularly repeating semiconductor structures (FIG. 1c) including a doping profile form a monitor device including at least one layer of the regularly repeating semiconductor structures (col. 6, line 66 to col. 7, line 7); planarizing the monitor device through a thickness of the regularly repeating semiconductor structures to reveal a target surface overlying the doping profile to form a monitor pattern (col. 7, lines 9-32); sputtering the target surface over a sputtering area including the monitor pattern through a thickness

thereof while simultaneously detecting and counting over time interval at least one type of species ejected from the target surface sputtering according to a secondary ion mass spectroscopy procedure (SIMS) (col. 7, lines 9-41); and determining a 2-dimensional doping profile for an individual semiconductor structure (col. 7, lines 33-42 and FIG. 8).

In re claim 2, Lee discloses wherein the monitor pattern further comprises a regularly repeating pattern in at least two planar dimensions of the doping profile (FIG. 1c).

In re claim 4, Lee discloses wherein the target surface comprises a polysilicon substrate including the doping profile (col. 7, lines 3-7).

In re claim 5, Lee discloses wherein the monitor device further comprises multiple layers of the regularly repeating semiconductor structures (FIG. 1c).

In re claim 6, Lee discloses wherein the steps of planarizing and sputtering are carried out for at least one layer of the multiple layers (FIG. 1c).

In re claim 8, Lee discloses wherein the target surface has an area sufficient to include the sputtering area (FIG. 1c).

In re claim 9, Lee discloses wherein the regularly repeating semiconductor structures include CMOS structures and memory structures (col. 4, lines 54-61).

In re claim 10, Lee discloses wherein the monitor pattern forms regularly repeating rows (FIG. 1c).

In re claim 11, Lee discloses wherein the monitor pattern forms regularly repeating rows of regularly repeating rectangles (FIG. 1c).

In re claim 12, Lee discloses a monitor device for analysis of a 2-dimensional doping profile of an individual semiconductor device structure according to a SIMS procedure comprising (See FIGS. 1a-11b): a planarized surface intersecting a plurality of regularly repeating semiconductor structures comprising a doping profile to form a target surface wherein the regularly semiconductor structures included in at least one layer of the monitor device wherein the monitor device being mountable in a secondary ion mass spectrometer for sputtering the target surface through a thickness to determine a 2-dimensional doping profile of an individual semiconductor structure (col. 7, lines 3-41 and FIG. 8).

In re claim 13, Lee discloses wherein the target surface further comprises a regularly repeating pattern in two planar dimensions of the doping profile formed by the planarized surface intersecting a plurality regularly repeating semiconductor structures (FIG. 1c).

In re claim 14, Lee discloses wherein the target surface is disposed at about the start of the doping profile extending through a thickness perpendicular to the target surface (col. 7, lines 3-41 and FIG. 1c)

In re claim 15, Lee discloses wherein the monitor device further comprises multiple layers of the regularly repeating semiconductor structures (FIG. 1c).

In re claim 16, Lee discloses wherein the target surface has an area sufficient to include a sputtering area (col. 7, lines 3-41).

In re claim 18, Lee discloses wherein regularly repeating semiconductor structures include CMOS structures and memory structures (col. 4, lines 54-61).

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In re claims 19 and 20, Lee discloses wherein the regularly repeating pattern approximates regularly repeating rows of rectangular shapes (FIG. 1c)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Patent 6,172,399) as applied to claims 1-2, 4-6, 8-16 and 18-20 above.

In re claim 3, the process of planarizing a layer using a chemical mechanical polishing (CMP) step is well-known to a person having ordinary skill in the art.

In re claim 17, there is no evidence indicating the length of the rectangular shape is critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Amendment

Response to Applicant's Arguments

Applicant's arguments filed 12/08/2003 have been fully considered but they are not persuasive.

In response to Applicant's argument that nowhere do Lee et al. disclose determining 2-dimensional doping profiles of individual semiconductor structures as disclosed and claimed by Applicants, examiner respectfully disagree, Applicants are directed to (col. 7, lines 33-42 and FIG. 8) where Lee discloses determining a 2-dimensional doping profile of a semiconductor device. Specifically, as shown in FIG. 8, many SIMS points are taken across the breadth of the device. The SIMS measurements are taken at different points in the x-plane, measured from the microwave beam exposure center (i.e. 0.43 mm, 1.2 mm, 5.9 mm and 24 mm respectively). The graph of FIG. 8 displays the dopant concentration in the z-plane as determined by the depth from the surface. Thus, the determination of the doping profiles of individual semiconductor structures in the x and z planes as discloses by Lee is a 2-dimensional doping profile measurements.

For this reason, examiner holds the rejection proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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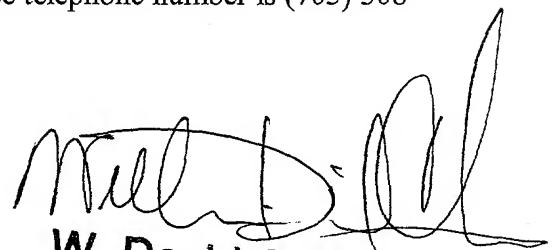
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
January 16, 2004



W. David Coleman
Primary Examiner
Tech Center 2800